

Student Handout

Custom Babies: The Ethical Dilemma of Genetic Editing

Name :

Date :

Custom Babies: The Ethical Dilemma of Genetic Editing



Introduction:

Since 2012, Jennifer Doudna has monumentally impacted the scientific community with her research of CRISPR-Cas9 as a possible tool that would revolutionize gene editing technology.

There have been numerous conversations about the ethics of using gene-editing technology in humans. Whether or not to experiment with somatic cell gene editing or gametic cell editing. Or prenatal gene editing versus postnatal gene editing. After scientist He Jiankui genetically edited three embryos that were born, the ethics of prenatal genetic editing has been particularly important to discuss in the scientific community and society at large.

In this lesson you will consider the variety of perspectives and societal impacts on prenatal genetic-editing technology.

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Prenatal Gene Editing Cases

In this activity, you will be presented with two separate cases dealing with prenatal gene-editing. As a group, you will read through the cases, consider the different perspectives associated with each, and reflect on the ethical implications of each.

Case 1: Gene Editing HIV (read the full case [here](#))

Grace and Mark desire to have a child together, however Mark is HIV positive. Mark never thought they'd be able to have children. Worried about the possibilities of their children contracting HIV, they consult their physician. They are notified of a research opportunity that uses gene-editing technology (CRISPR) to edit the *CCR5* gene (a protein that allows HIV to enter cells) so that the children could be protected from an HIV infection. This would be done through an in vitro fertilization process, a common procedure used for people seeking assistive reproductive technologies (such as same-sex couples, donors-single parents, folks struggling with infertility, etc). The sperm donor (Mark) and egg donor (Grace) would have their cells combined into an embryo and eventually transferred into a uterus.

- How does Grace and Mark's views of AIDS/HIV discrimination and stigma impact their decision on whether or not to use CRISPR gene-editing technology?
- In general, how could societal views of diseases, disorders, and disabilities impact science's ethical decision making in gene-editing?
- What factors should a researcher consider when contemplating using gene-editing technology for medical reasons?
- In this case and other cases where genetic-editing is used for medical reasons (prevention or treatment), is it ethical to allow prenatal gene-editing technology? Why or why not? Use both societal/cultural and scientific reasoning.

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Case 2: Gene Editing Gender (read the full article [here](#))

Maria and David are interested in having a child together but are struggling to conceive. They find that their insurance covers the very costly assisted-reproduction technology of in vitro fertilization. With multiple successful embryos, doctors screened the embryo's DNA using preimplantation genetic diagnosis (PGD) tests that are used to screen for any genetic differences or concerns. The fertility doctor returned asking whether or not they wanted to choose to incubate embryos that were a boy or a girl? Using CRISPR gene-editing technology would allow them to choose the eye color and other physical characteristics of their future children. After reflection, they decide to choose the embryo with the highest chance of a pregnancy success. The brown-eyed couple in the lobby next to them discloses their excitement of getting to select a boy with blue eyes.

- What factors led to Maria and David's decision? What factors might impact the decisions of the other couple in the lobby (for a baby boy with blue eyes)?
- In general, how could societal views of gender, race, sex, and other beauty standards impact science's ethical decision making in gene-editing?
- What factors should a researcher consider when contemplating using gene-editing technology for cosmetic reasons?
- In this case and other cases where genetic-editing is used for cosmetic reasons, is it ethical to allow prenatal gene-editing technology? Why or why not? Use both societal/cultural and scientific reasoning.

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Concluding Thoughts

Capture your final thoughts and opinions in the space below. Consider the following questions as a group:

- In which cases, if any, should prenatal genetic editing technology be used? Why or why not? (Consider societal/cultural and scientific reasons)
- How does society impact genetic- editing science?
- How does genetic-editing science impact society?

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Student Assessment

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1. Describe the activity. What was the issue you learned about?
2. What did this activity teach you about the relationship between biology and society?
3. How did the activity illustrate how human values influence science?
4. What are the different perspectives presented as part of the activity today?
5. How do your personal values or experiences relate to the themes presented in this activity, if at all? Has the activity impacted your personal values or views?
6. Did the activity make you think differently about the issue than before today's activity? How?
7. How does the CRISPR-Cas9 enzyme edit the genome?
8. What are the pros and cons of using CRISPR-Cas9 technology to genetically edit humans?